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Educational Product
Educators | **Grades 6-8**
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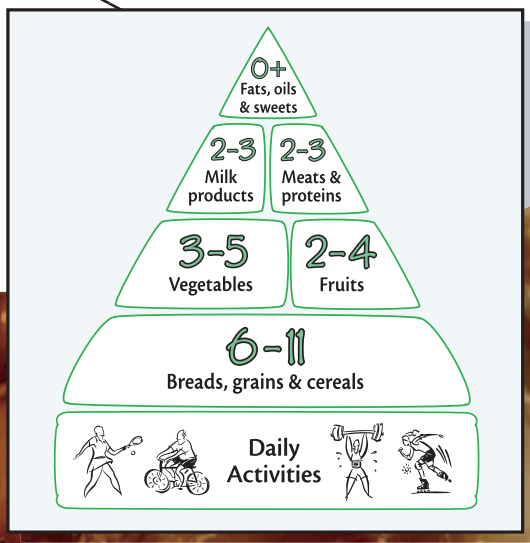
NASA CONNECT™

better health

from space to earth

An Educator Guide with Activities in Mathematics, Science, and Technology

nutrition and exercise challenge



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NASA CONNECT™

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NUTRITION AND EXERCISE CHALLENGE

Nutrition and Exercise Challenge

Specialty Menu Cards

Student Handouts

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The hands-on activity used in this educator guide appears in *From Outer Space to Inner Space/Food and Fitness: Activities Guide for Teachers* created by Baylor College of Medicine for the National Space Biomedical Research Institute under NASA Cooperative Agreement NCC 9-58. The activities used with permission of Baylor.

Nutrition and Exercise Challenge

BACKGROUND

The Food Pyramid is a guide that helps people determine what to eat each day. It is not a rigid prescription. Instead, the Food Pyramid calls for eating a variety of foods to obtain all the nutrients the body needs. In general, it is a good idea to choose foods that are lower in fat. Whenever possible, limit the fats and sugars added to foods (butter, margarine, gravy, jam, etc.) and choose fewer foods that are high in sugars (candy, desserts, and soft drinks). The Food Pyramid has been adapted in a variety of ways to reflect ethnic preferences, personal beliefs, and health needs.

THE CHALLENGE

Should everyone follow the same guidelines for choosing foods to eat? What about people such as athletes, vegetarians, and astronauts, who have special requirements? What about people such as diabetics, pregnant women, and people who are lactose intolerant and need to make different dietary choices for health reasons? Now it's your turn to take the Nutrition and Exercise Challenge. Working in groups, your task is to choose one of seven Specialty Menu Cards. Select from a person with hypertension, a strict vegetarian, a pregnant woman, a person who is lactose intolerant, a diabetic, an athlete in training, or an astronaut in space. You will plan a menu for breakfast, lunch, dinner, and snacks that meet the particular dietary needs described on the Specialty Menu Card. Also, you will create an exercise program for the Specialty Menu Card you choose.

MATERIALS

Each group of students will need the following:

- *Serving Sizes & Calories* handout
- *Healthy Choices* handout
- 1 Specialty Menu Card

PRESENTATION

Submit your nutrition and exercise programs to the NASA CONNECT™ web site *http://connect.larc.nasa.gov* in the form of a report, PowerPoint presentation, or other delivery method. There's a good chance that your plan and program will be seen by millions of students across the country. In fact, you might receive some cool NASA stuff! We look forward to your submittals.

SPECIALTY MENU CARD

Person With Hypertension

Who:	Older Man
Age:	65
Height:	69 in.
Weight:	180 lb (10 lb overweight)
Energy Level:	Low
Total Daily Caloric intake need:	2119 cal

Hypertension is the medical term for high blood pressure. It affects about one out of every four American adults. High blood pressure makes the heart work too hard and increases the risk of heart disease and stroke. It also can cause other problems, such as kidney disease and blindness. People who have diabetes or are overweight are at an increased risk for high blood pressure.

Reducing the amount of salt in the diet can help lower and control high blood pressure. People with hypertension should limit their consumption of processed foods that contain a lot of salt, such as cereals, soups, canned goods, frozen dinners, ketchup, and pickles. Some foods that can help to reduce high blood pressure are shown (with recommended daily servings) below:

- Whole grains and grain products: 7–8 servings (also soybean products like tofu)
- Vegetables: 4–5 servings (especially calcium-rich leafy green vegetables)
- Fruits: 4–5 servings
- Low-fat or nonfat dairy foods: 2–3 servings
- Meat, poultry, or fish: 2 or fewer servings (trim away visible fat and skin from meat and broil, roast, or boil instead of frying)
- Nuts, seeds, and legumes: 4–5 servings (per week)

High Blood Pressure

1. You will plan a one-day menu that includes breakfast, lunch, dinner, and snacks to meet the particular dietary needs of an inactive person who suffers from hypertension (high blood pressure) and who is slightly overweight.

2. Personal fitness, particularly cardiovascular fitness, also is essential for good health. You will create an exercise program for the person with hypertension. You may use outside sources such as the library or the Internet.

3. Review and refer to the guidelines on the *Serving Sizes & Calories* and *Healthy Choices* handouts to make substitutions, if needed, to provide this person with a balanced diet.

SPECIALTY MENU CARD

Strict Vegetarian

Who:	Teenage Boy
Age:	14
Height:	65 in.
Weight:	118 lb
Energy Level:	Medium
Total Daily Caloric intake need:	2459 cal

There are several types of vegetarians. A strict vegetarian is someone who eats only plant-based foods and doesn't eat any form of animal foods. There are, however, many variations on a vegetarian diet. Some vegetarians avoid meat, fish, and poultry but include diary products and/or eggs in their diets. Others exclude only red meat. People choose to follow a vegetarian diet for religious, political, personal, or health reasons.

It is very important that a vegetarian eat a wide variety of foods. Teenage vegetarians must be particularly careful to get sufficient amounts of protein, calcium, iron, and vitamin B12. Vitamin B12, which helps in the formation of red blood cells and in the functioning of the nervous system, is not naturally present in plants, but lots of cereals are fortified with B12, as are some brands of soymilk.

Vegetarians also have to pay attention to the kind of proteins in their diets. Most plant foods do not contain all of the amino acids (building blocks of protein) and must be combined to obtain the right balance. Examples of combinations include peanut butter and bread, rice or corn and beans, and lentils and pasta. Beans and nuts are the best plant sources of protein.

Vegetarian

1. You will plan a one-day menu that includes breakfast, lunch, dinner, and snacksto meet the particular dietary needs of a moderately active person who follows a strict vegetarian diet.

2. Personal fitness, particularly cardiovascular fitness, also is essential for goodhealth. You will create an exercise program for the strict vegetarian. You may use outside sources such as the library or the Internet.

3. Review and refer to the guidelines on the *Serving Sizes & Calories* and *Healthy Choices* handouts to make substitutions, if needed, to provide this person with a balanced diet.

SPECIALTY MENU CARD

Pregnant Woman

Who:	Young Woman
Age:	27
Height:	64 in.
Weight:	125 lb
Energy Level:	Medium
Total Daily Caloric intake need:	2350 cal

When a woman is pregnant, a healthy diet is important because everything she eats or drinks affects her baby's development. A pregnant woman needs increased daily servings of proteins and dairy products. She also may need to eat smaller meals more often (for example, six small meals instead of three large ones). Her diet should include the following:

- 3 servings of high protein foods, such as beans, meat, fish, tofu, and nuts
- 3–4 servings of dairy products
- 3–5 vegetables, especially green leafy ones
- 2 servings of vitamin C-rich foods, like citrus fruits, tomatoes, peppers, and potatoes
- 8 cups of non-caffeinated fluids every day. Fluids are important to help maintain proper body temperature, to transport nutrients, and most importantly to cushion and protect the baby.

A pregnant woman should avoid certain foods and beverages.

- Alcohol
- Undercooked or raw meat
- Raw eggs (found in uncooked dough or batter, for example)
- Soft, unpasteurized cheese
- Fish that are high in fat
- Empty Calories (food and drinks that have little nutrition, such as soft drinks and candy)

Pregnancy

1. You will plan a one-day menu that includes breakfast, lunch, dinner, and snacksto meet the particular dietary needs of a moderately active woman who is in her sixth month of pregnancy.

2. Personal fitness, particularly cardiovascular fitness, also is essential for goodhealth. You will create an exercise program for the pregnant woman. You may use outside sources such as the library or the Internet.

3. Review and refer to the guidelines on the *Serving Sizes & Calories* and *Healthy Choices* handouts to make substitutions, if needed, to provide this person with a balanced diet.

SPECIALTY MENU CARD

Lactose Intolerant

Who:	Young Active Man
Age:	22
Height:	72 in.
Weight:	185 lb
Energy Level:	High
Total Daily Caloric intake need:	3784 cal

Lactose is a kind of sugar found in milk. Some people have difficulty digesting lactose and may have symptoms, such as nausea, cramps, gas, and diarrhea when they eat foods containing milk products. Young children with lactose intolerance should not eat milk products. Most older children and adults differ in the amounts of lactose they can handle. Lactose intolerance is very common in adults and is not dangerous.

The most important nutrient in dairy products is calcium, which is essential for the growth and repair of bones. It can be difficult for people with lactose intolerance to get enough calcium; however, lactose-reduced milk and other products are available at many supermarkets. Also, many nondairy foods are high in calcium. Green vegetables, such as broccoli and collard or turnip greens, and fish with soft, edible bones such as salmon and sardines are excellent sources of calcium.

Lactose intolerant people may have to avoid many prepared foods that contain milk, such as bread and other baked goods; processed breakfast cereals and drinks; instant potatoes; soups; margarine; lunch meats; salad dressings; candies and other snacks; mixes for pancakes, biscuits, and cookies; and some products labeled nondairy, such as powdered coffee creamer and whipped toppings.

Lactose Intolerance

1. You will plan a one-day menu that includes breakfast, lunch, dinner, and snacksto meet the particular dietary needs of a moderately active person who cannot eat foods containing lactose.

2. Personal fitness, particularly cardiovascular fitness, also is essential for goodhealth. You will create an exercise program for the lactose intolerant person. You may use outside sources such as the library or the Internet.

3. Review and refer to the guidelines on the *Serving Sizes & Calories* and *Healthy Choices* handouts to make substitutions, if needed, to provide this person with a balanced diet.

SPECIALTY MENU CARD

Type 2 Diabetic

Who:	Teenage Girl
Age:	16
Height:	63 in.
Weight:	172 lb
Energy Level:	Low
Total Daily Caloric intake need:	2125 cal

Cells of the body receive energy from sugar dissolved in the bloodstream. The hormone insulin allows cells to take glucose, a kind of sugar, from the blood. Type 2 Diabetes makes it harder for cells to take in glucose. Over time, diabetes can result in damage to the eyes, kidneys, heart, teeth, and gums.

Diabetics should eat about the same amount of food at the same times each day and avoid eating too much at one time. Regular exercise under a doctor's supervision also is beneficial. An overweight person with diabetes can safely lose weight by lowering his/her daily Caloric intake by 300–500 calories/day. Diabetics should do the following:

- Eat less sugar (regular soft drinks and sugary foods) and fewer refined carbohydrates (processed, white foods, like white bread, white rice, and white potatoes). They should eat high-fiber foods that contain whole grains (whole wheat bread, whole grain pasta, brown rice, and beans).
- Reduce the fat in their diets by eating lean meats, grilled foods, and part-skim or low-calorie cheese. They also can eat more fish and poultry (without the skin) but only 3–4 eggs per week. Protein intake should come mostly from grains and vegetables instead of meats.

Type 2 Diabetes

1. You will plan a one-day menu that includes breakfast, lunch, dinner, and snacksto meet the particular dietary needs of an inactive person diagnosed with Type 2 Diabetes. This person is overweight and needs to reduce her daily Caloric intake safely.

2. Personal fitness, particularly cardiovascular fitness, also is essential for goodhealth. You will create an exercise program for the diabetic. You may use outside sources such as the library or the Internet.

3. Review and refer to the guidelines on the *Serving Sizes & Calories* and *Healthy Choices* handouts to make substitutions, if needed, to provide this person with a balanced diet.

SPECIALTY MENU CARD

Athlete in Training

Who:	Teenage Girl
Age:	16
Height:	62 in.
Weight:	105 lb
Energy Level:	High
Total Daily Caloric intake need:	2541 cal

To perform at the highest level, athletes must have proper nutrition, as well as exercise and practice. The main differences between an athlete's diet and a non-athlete's diet are that an athlete needs more Calories and fluids. Athletes must consume more Calories than most people do to replace energy consumed during physical exertion. Nutrients also need to be replenished. Athletes should drink water before, during, and after exercise and physical activity. They should drink water even when they are not thirsty to maintain adequate fluid levels in their bodies and prevent dehydration.

It is usually recommended that athletes eat three to four hours before a competition. Allowing enough time between eating and competing gives enough time for food to digest and makes maximum energy available from food.

- High fat foods (products with whole milk or cream, for example) can take longer to digest and may interfere with athletic performance.
- Carbohydrate foods, such as pasta, breads, and cereals are popular choices before competition because they provide energy, as well as fiber, vitamins, and minerals.

Athlete in Training

1. You will plan a one-day menu that includes breakfast, lunch, dinner, and snacksto meet the particular dietary needs of an athlete in training for an upcoming competition.

2. Personal fitness, particularly cardiovascular fitness, also is essential for goodhealth. You will create an exercise program for the athlete in training. You may use outside sources such as the library or the Internet.

3. Review and refer to the guidelines on the *Serving Sizes & Calories* and *Healthy Choices* handouts to make substitutions, if needed, to provide this person with a balanced diet.

SPECIALTY MENU CARD

Astronaut in Space

Who:	Man
Age:	39
Height:	70 in.
Weight:	180 lb
Energy Level:	High
Total Daily Caloric intake need:	3457 cal

Without the pull of gravity, fluids distribute themselves equally throughout the body (instead of being pulled toward the legs and feet), leading to changes in the circulatory system. At the same time, muscles and bones become smaller and weaker because they do not have to work as hard in space.

The body uses about the same amount of energy in space as it does on Earth. Menus for space should meet each individual's daily nutritional requirements based on age, body weight, and activity. The portions of fats and proteins consumed by astronauts may be slightly higher because fats are energy dense (so less volume is needed to meet energy needs). Fats also improve the taste of foods in space. Increased protein intake helps to offset changes to muscles.

All foods are selected for easy handling in space (some foods could float into equipment or be inhaled). Liquids are served in plastic bags and sipped with straws. Space food favorites include tortillas (stay fresh longer and have fewer crumbs than bread) and beef sticks. Spicy food also is preferred because microgravity and head congestion dull the astronaut's sense of taste. Fruits and vegetables are important because they may help protect the astronaut's body from damage by cancer-causing radiation in space.

Dining in Space

1. You will plan a one-day menu that includes breakfast, lunch, dinner, and snacksto meet the particular dietary needs of an active person who is working onboard a space station orbiting Earth.

2. Personal fitness, particularly cardiovascular fitness, also is essential for goodhealth. You will create an exercise program for the astronaut. You may use outside sources such as the library or the Internet.

3. Review and refer to the guidelines on the *Serving Sizes & Calories* and *Healthy Choices* handouts to make substitutions, if needed, to provide this person with a balanced diet.

Serving Sizes & Calories

Use the values below to figure out how many Calories are in each of the items on your menu.

Item (amount)	Cal
Apple, fresh (1 medium)	91
Apple juice (1 cup)	90
Applesauce, sweetened (1/2 cup)	97
Asparagus, fresh (1/2 cup)	20
Avocado, mashed (1/2 cup)	175
Bacon, cooked (1 slice)	35
Bagel, plain (3.5 in.)	195
Banana, fresh (1 medium)	120
Beans, baked (1/2 cup)	150
Beans, refried (1/2 cup)	110
Beef, ground, broiled (3 oz portion)	238
Beef, pot roast, roasted (3 oz portion)	284
Beef, steak, broiled (3 oz steak)	185
Bread, hamburger bun (1 medium)	180
Bread, hot dog bun (1 medium)	116
Bread, pita, wheat or white (1/2 pocket)	71
Bread, sandwich, wheat or white (1 slice)	70
Broccoli, fresh (1 cup)	25
Brownie (1 piece)	160
Burrito, bean and cheese (6 oz burrito)	300
Butter (3 teaspoons or 1 tablespoon)	300
Cake, chocolate, frosted (1 cupcake-size)	188
Candy, chocolate bar (2 fun size)	190
Candy, hard (1 piece)	24
Candy, jelly beans (10 small)	40
Carrots, cooked (1/2 cup)	35
Cauliflower, cooked (1/2 cup)	14
Celery, fresh (1 stalk)	10
Cereal, sweetened, dry (1 cup)	220
Cereal, unsweetened, dry (1 cup)	110
Cheese, American (1 slice)	110
Cheese, Swiss (1 slice)	90
Chicken, thigh, fried (1 piece)	162
Chicken, thigh, roasted (1 piece)	153
Chicken, breast, fried (1 piece)	218
Chicken, breast, roasted (1 piece)	193
Chicken, nuggets (6 pieces)	290
Chicken, deli sandwich (2 slices)	45
Chili, with or without beans (1 cup)	300
Cookie, chocolate chip (1 cookie)	78
Cookie, chocolate sandwich (3 cookies)	170
Cookie, oatmeal (2 cookies)	110
Cookie, vanilla wafer (8 cookies)	140
Corn, cooked (1/2 cup)	67
Chips, any style (1 oz or about 15 chips)	150
Corn dog, cooked (1 corn dog)	330
Cottage cheese (1/2 cup)	120
Cracker, graham (8 small squares)	120
Cracker, peanut butter wheat (1 pkg)	190
Cracker, saltine (1 cracker)	13
Cream cheese (2 tablespoons)	100
Doughnut, plain (1 medium)	110

Item (amount)	Cal
Egg (1 medium)	77
Egg roll, fried (1 roll, 3.5 oz)	202
Enchilada, cheese (1 enchilada, 5.7 oz)	320
Fish, catfish, fried (3 oz portion)	194
Fish, flounder, baked (3 oz portion)	99
Grapes, fresh (1 cup)	58
Grapefruit (1 medium)	80
Gravy (1/4 cup)	164
Green beans, cooked (1/2 cup)	22
Hot dog (1 hot dog)	145
Ice cream, regular (1/2 cup)	130
Ice cream, rich (1/2 cup)	290
Jelly or jam (1 tablespoon)	40
Ketchup (1 tablespoon)	16
Lettuce, iceberg, fresh (1 cup)	10
Macaroni and cheese (1 cup)	320
Margarine (3 teaspoons or 1 tablespoon)	102
Mayonnaise (1 tablespoon)	100
Milk, 2% (1 cup)	120
Milk, whole (1 cup)	150
Milk drink, chocolate (1 cup)	238
Milk drink, hot chocolate/cocoa (1 cup)	147
Milk drink, milkshake (1 cup)	288
Muffin, any flavor (1 medium)	180
Mushrooms, fresh (1 cup)	20
Nachos with cheese (8 chips)	345
Noodles, egg, cooked (1 cup)	213
Noodles, chow mein, cooked (1 cup)	237
Noodles, rice, cooked (1 cup)	192
Oatmeal, plain, cooked (1/2 cup)	72
Oil, cooking (1 tablespoon)	120
Olives, green (4 medium)	15
Onion, fresh (1/2 cup, chopped)	21
Onion rings, fried (9 rings)	275
Orange, fresh (1 medium)	60
Orange juice (1 cup)	105
Pancake, plain (1 4-in. pancake)	83
Pasta, cooked (1 cup)	200
Pastry, toaster-type, no icing (1 pastry)	200
Peach, fresh (1 medium)	37
Peaches, canned (1/2 cup)	100
Pear, fresh (1 medium)	98
Peanuts (1/4 cup)	214
Peanut butter (2 tablespoons)	190
Peas, canned (1/2 cup)	60
Peas, black-eyed with bacon (1/2 cup)	90
Peppers, banana or jalapeno (3 peppers)	11
Pickles, dill hamburger chips (5 pieces)	5
Pickles, sweet (3 small)	40
Pie, apple (1 slice or 1/6-slice of pie)	270
Pineapple, canned (1/2 cup)	100
Pizza, cheese (1/8 of 12-in. pie)	140

Item (amount)	Cal
Pizza, pepperoni (1/8 of 12-in. pie)	180
Pocket sandwich, chicken (1 pocket)	300
Popcorn, air popped (1 cup)	30
Popcorn, microwave butter (3 cups)	100
Pork, chop (3 oz portion)	213
Pork, ham (1 cup chopped)	369
Potato, baked, plain (1 large)	280
Potato, french fried (20 pieces)	235
Potato, mashed (1/2 cup)	160
Potato, tater tot style (9 pieces)	160
Potato, sweet (1 small)	118
Pretzel snack mix (1/2 cup)	140
Pudding cup, any flavor (1/2 cup)	180
Raisins (1/4 cup)	112
Ravioli, beef (1 cup)	260
Ravioli, cheese (1 cup)	220
Rice cake (1 cake)	40
Rice, brown or white, cooked (1/2 cup)	120
Rice, fried (3/4 cup)	190
Salad dressing, ranch (2 tablespoons)	150
Salad dressing, fat-free (2 tablespoons)	50
Salsa, con queso (2 tablespoons)	90
Salsa, picante (2 tablespoons)	10
Snacks, cheese puffs, baked (3/4 cup)	140
Snacks, Cheetos-style (26 pieces)	150
Soft drink, cola (12-oz can)	150
Soft drink, diet cola (12-oz can)	2
Soup, cream style (1 cup)	130
Soup, noodle style (1 cup)	70
Soup, vegetable (1 cup)	90
Soup, vegetable with meat (1 cup)	134
Sour cream (2 tablespoons)	60
Spaghetti sauce, vegetable (1/2 cup)	100
Spaghetti sauce, meat flavored (1/2 cup)	140
Spinach, canned (1/2 cup)	25
Squash, canned (1/2 cup)	25
Strawberries, fresh (1/2 cup)	50
Sugar, white (1 tablespoon)	45
Sunflower seeds (1/4 cup)	186
Sushi, California or tuna roll (1 piece)	25
Syrup, pancake (1/4 cup)	210
Syrup, pancake, lite (1/4 cup)	100
Tofu (1-in. slice or 3 oz)	50
Tortilla, corn or flour (1 tortilla)	140
Taco, beef, prepared (1 small)	370
Taco salad (1 1/2 cups)	279
Tamales, beef (3 small)	280
Tomato, fresh (1 medium)	30
Tuna, canned in water (2 oz)	70
Turkey, without skin (1 cup)	238
Yogurt, plain (1 cup)	144
Yogurt, with fruit (1 cup)	240

Note. Calorie counts on prepared foods may be higher or lower depending on how the food is prepared and the different ingredients that may be added. Check package labels for specific information on prepared foods.

From Outerspace to Innerspace / Food and Fitness

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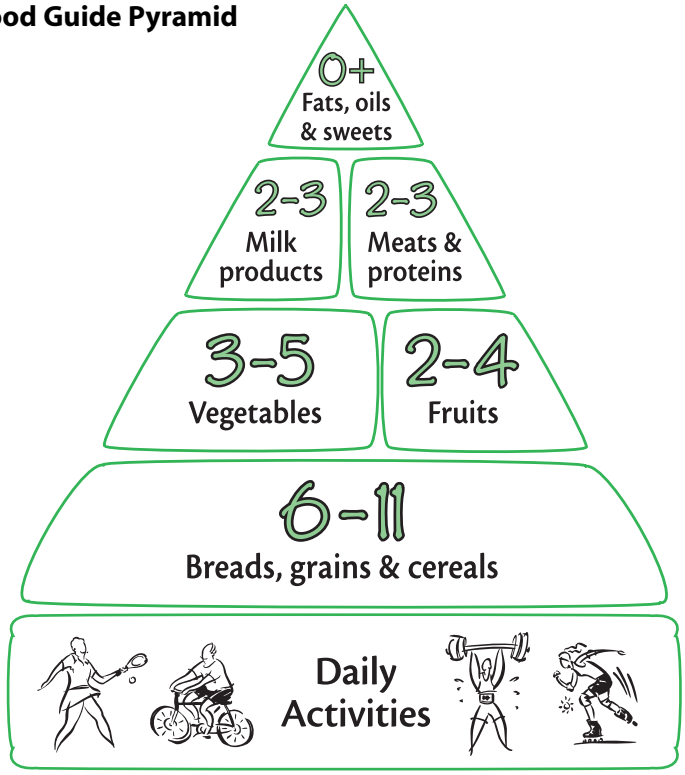
Healthy Choices

Food Guide Pyramid



1. The Food Guide Pyramid helps you choose a healthy diet.
2. The Food Pyramid recommends the number of servings you should have from each food group each day. These serving sizes may be different from the ones on Nutrition Facts labels.
3. The key to healthy eating is to eat a wide variety of foods. The Pyramid is designed to help you eat a variety of foods to get the nutrients you need and the right amount of calories to maintain healthy body weight.

Safety Note. Everyone has unique nutritional and health care needs. This material is not intended as a replacement for professional medical advice. Before beginning any diet, supplement or exercise program, discuss it with your doctor or qualified health care provider.

RECOMMENDED DAILY SERVINGS

(Start at the Base of the Pyramid)

Breads, grains & cereals | 6–11 Servings
The bread group includes grains, rice, potatoes, cereals, tortillas or pasta. One serving equals 1 slice of bread, 1 tortilla, 1 cup of ready-to-eat cereal, 1/2 cup of cooked cereal, rice or macaroni, or 5–6 small crackers. Cakes, cookies, pies, french fries and chips also count as carbohydrates. Whenever possible, choose whole grains.

Vegetables | 3–5 Servings
One serving of vegetables equals 1 cup of raw, leafy vegetables or 1/2 cup of cooked vegetables (or 1/2 cup chopped raw), or 3/4 cup of vegetable juice.

Fruits | 2–4 Servings
One serving of fruit equals 1 medium apple, banana or orange, 1/2 cup of cooked or canned fruit or 3/4 cup of fruit juice.

Meats & other proteins | 2–3 Servings
The protein group includes meat, chicken, fish, nuts and beans. Pick 2–3 servings from this group. One serving equals 2–3 ounces of cooked meat, poultry or fish, 1 cup of cooked dried beans, 2 eggs, 4 tablespoons of peanut butter or 2/3 cup of nuts.

Milk products | 2–3 Servings
Milk products include milk, yogurt, cheese, cottage cheese and pudding. One serving equals 1 cup of milk or yogurt, 1/2 cup of pudding or 2 slices of cheese. Low-fat milk products are good sources of protein and calcium.

Fats, oils & sweets | Eat sparingly
Fats, oils or sweets are found in candy, nuts, fried foods, cakes, pies, cream, butter, cheese and combination foods. One serving equals 1/8 avocado, 1 tablespoon of cream cheese or salad dressing, 1 teaspoon of butter, margarine, oil or mayonnaise, or 10 peanuts. Healthy fats are liquid at room temperature.

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